

**Strand III: Data Analysis and Statistics**  
**Standard I: Collection, Organization and Presentation of Data** - Students collect and explore data, organize data into a useful form, and develop skill in representing and reading data displayed in different formats.

- Key Ideas:
- 1. Data drive many facets of modern society; knowing what data to collect and when and how to obtain them is the starting point of quantitative literacy.
  - 2. Data are of little use until they are organized and presented in a meaningful format.
  - 3. Since different representations highlight different patterns in the data, students must make critical judgments.
  - 4. To solve problems, students frequently must decide what data are needed and plan how to obtain, organize and present them.

Middle School Benchmark	Grade 5	Grade 6	Grade 7	Grade 8
1. Collect and explore data through observation, measurement, surveys, sampling techniques and simulations.				
2. Organize data using tables, charts, graphs, spreadsheets and data- bases.	<b>Construct and interpret line graphs</b> <b>D.RE.05.02</b> Construct line graphs from tables of data; include axis labels and scale.		<b>Represent data and interpret</b> <b>D.RE.07.01</b> Represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions. <b>D.AN.07.02</b> Create and interpret scatter plots and use an estimated line of best fit to answer questions about the data.	
3. Present data using a variety of appropriate representations and explain why one representation is preferred over another or how a particular representation may bias the presentation.	<b>Construct and interpret line graphs</b> <b>D.RE.05.01</b> Read and interpret line graphs, and solve problems based on line graphs, e.g., distance - time graphs, and problems with two or three line graphs on same axes, comparing different data. <b>D.RE.05.02</b> Construct line graphs from tables of data; include axis labels and scale.	<b>Represent linear functions using tables, equations, and graphs</b> <b>A.RP.06.08</b> Understand that graphs and tables can suggest relationships between quantities. <b>A.RP.06.10</b> Represent simple relationships between quantities, using verbal descriptions, formulas or equations, tables, and graphs, e.g. perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches	<b>Represent data and interpret</b> <b>D.RE.07.01</b> Represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions. <b>D.AN.07.02</b> Create and interpret scatter plots and use an estimated line of best fit to answer questions about the data.	
4. Identify what data are needed to answer a particular question or solve a given problem, and design and implement strategies to obtain organize and present those data.				

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**Standard 2: Description and Interpretation** - Students examine data and describe characteristics of a distribution, relate data to the situation from which they arose, and use data to answer questions convincingly and persuasively.

- Key Ideas:
1. The ability to read and interpret data has become a basic-literacy skill in today's world.
  2. Patterns in data distributions help students to interpret the findings.
  3. Students learn to draw conclusions and to convince and persuade using data to justify their positions.
  4. Students should think critically about the data they encounter and exercise judgment in describing and interpreting data.
  5. Gathering and interpreting data are important strategies for analyzing and solving problems.

Middle School Benchmark	Grade 5	Grade 6	Grade 7	Grade 8
1. Critically read data from tables, charts or graphs and explain the source of the data and what the data represent.				
2. Describe the shape of a data distribution and identify the center, the spread, correlations and any outliers.	<b>Find and interpret mean and mode for a given set of data</b> <b>D.AN.05.03</b> Given a set of data, find and interpret the mean (using the concept of fair share) and mode.		<b>Compute statistics about datasets</b> <b>D.AN.07.04</b> Find and interpret the median, quartiles, and interquartile range of a given set of data.	<b>Draw, explain, and justify conclusions based on data</b> <b>D.AN.08.01</b> Determine which measure of central tendency (mean, median, mode) best represents a data set, e.g. salaries, home prices for answering certain questions, and justify the choice made.
3. Draw, explain and justify conclusions based on data.	<b>Construct and interpret line graphs</b> <b>D.RE.05.01</b> Read and interpret line graphs, and solve problems based on line graphs, e.g., distance - time graphs, and problems with two or three line graphs on same axes, comparing different data. <b>D.AN.05.04</b> Solve multi-step problems involving means.		<b>Represent data and interpret</b> <b>D.RE.07.01</b> Represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions. <b>D.AN.07.02</b> Create and interpret scatter plots and use an estimated line of best fit to answer questions about the data.	
4. Critically question the sources of data; the techniques used to collect, organize and present data; the inferences drawn from the data; and the possible sources of bias in the data or their presentation.	<b>Construct and interpret line graphs</b> <b>D.RE.05.01</b> Read and interpret line graphs, and solve problems based on line graphs, e.g., distance - time graphs, and problems with two or three line graphs on same axes, comparing different data.			<b>Draw, explain, and justify conclusions based on data</b> <b>D.AN.08.02</b> Recognize practices of collecting and displaying data that may bias the presentation or analysis.
5. Formulate questions and problems and gather and interpret data to answer those questions.				

**Strand III: Data Analysis and Statistics**  
**Standard 3: Inference and Prediction** - Students draw defensible inferences about unknown outcomes, make predictions, and identify the degree of confidence they have in their predictions.

- Key Ideas:
- 1. Making and testing hypotheses is an essential technique for gaining new knowledge.
  - 2. In order to test hypotheses, students must carefully design their experimental techniques.
  - 3. Critical judgment develops as students learn to formulate, communicate and evaluate arguments and conclusions based on data.
  - 4. Patterns in known data give students confidence in making inferences about unknown situations.
  - 5. Students learn that inferences and predictions are powerful tools for answering questions and solving problems.

Middle School Benchmark	Grade 5	Grade 6	Grade 7	Grade 8
1. Make and test hypotheses.				
2. Design experiments to model and solve problems using sampling, simulations and controlled investigations.				
3. Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.				
4. Make predictions and decisions based on data, including interpolations and extrapolations.				
5. Employ investigations, mathematical models and simulations to make inferences and predictions to answer questions and solve problems.				